

## MATERIAL SAFETY DATA SHEET

DPM 950-30

### IDENTIFICATION

Name  
Potassium Cyanide

Grade

Synonyms  
Cyanide of Potassium

CAS Name  
Potassium Cyanide

I.D. Nos./Codes  
NIOSH Registry No: TS876000  
Wiswesser Code: KACN

Manufacturer/Distributor  
E. I. du Pont de Nemours & Co.(Inc.)

Address  
Wilmington, DE 19898



Chemical Family  
Alkali Metal Cyanide

Formula  
KCN

CAS Registry No.  
151-50-8

Du Pont Registry No.

Product Information Phone  
(302)774-2421

Transportation Emergency Phone  
Chemtrec (800)424-9300  
Du Pont Cyanide HOTLINE  
(For emergencies ONLY)  
(901)357-1546

### PHYSICAL DATA

Boiling Point, 760 mm Hg  
Not available

Specific Gravity  
1.52

Vapor Density  
Not volatile

% Volatiles by Vol.  
0

Form  
Solid

Appearance  
Crystalline

Color  
White

Odor  
None (but can have ammonia  
or HCN odor if damp)

Melting Point  
634.5°C (1174°F)

Vapor Pressure  
Negligible

Solubility in Water  
41.7% at 25°C (77°F)

Evaporation Rate (Butyl Acetate =1)

pH Information  
10.8 in ~saturated aqueous solution  
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Octanol/Water Partition Coefficient

## HAZARDOUS COMPONENTS

### Material(s)

Potassium Cyanide

### Approximate %

100

## HAZARDOUS REACTIVITY

### Instability

Very stable when dry.

### Incompatibility

Large amounts of highly toxic, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of HCN in confined areas.

### Decomposition

Moisture will cause slow decomposition, releasing poisonous HCN and ammonia gases.

### Polymerization

Will not occur.

## FIRE AND EXPLOSION DATA

### Flash Point

Will not burn

### Method

### Autoignition Temperature

### Flammable Limits in Air, % by Vol.

Lower

Upper Will not burn

### Fire and Explosion Hazards

Will not burn. Potassium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper and wood.

### Extinguishing Media

Water on fires near potassium cyanide. Do not use carbon dioxide (CO<sub>2</sub>) which will react with potassium cyanide to produce hydrogen cyanide if moisture is present.

### Special Fire Fighting Instructions

Potassium cyanide dissolves readily in water, therefore cyanide solution run-off may occur if containers are opened. Run-off should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

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## **HEALTH HAZARD INFORMATION**

### **Exposure Limits**

OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV® TWA=5 mg/m<sup>3</sup>, as CN. Both carry a "skin" notation indicating that cyanide may penetrate the skin (especially if broken). Control of vapor or dust inhalation alone may not be sufficient to prevent absorption of an excessive dose.

### **Significant Routes and Effects of Exposure**

May be fatal if inhaled, absorbed through the skin or swallowed. Contact with acid rapidly liberates dangerous amounts of HCN gas. Contact with water or weak alkalis can liberate smaller but still dangerous amounts of HCN gas. Causes eye burns. May irritate skin.

### **Safety Precautions**

Do not breathe dust or HCN gas. Do not get in eyes; avoid contact with skin or clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

### **First Aid and Medical Treatment**

Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides (in most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish).

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives. Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows.

Amyl nitrite and medical treatment kits for cyanide poisoning are available, with doctor's prescription, from pharmacies.

#### **A. FIRST AID - DIRECTIONS FOR GIVING AMYL NITRITE ANTIDOTE AND OXYGEN**

1. **CONSCIOUS:** For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning, follow paragraph A-2 below. For swallowing, see below paragraph C, FIRST AID - SWALLOWING CYANIDE.

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2. UNCONSCIOUS BUT BREATHING: Break an amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery.
  3. NOT BREATHING:
    - a. Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victim's mouth and cause choking.
    - b. If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.
  4. AMYL NITRITE NOTES:
    - a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.
    - b. If treating poison victim in a windy or drafty area, provide something - a rag, shirt, wall, drum, cupped hands, etc. - to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the victim's lungs.
    - c. Rescuers should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.
    - d. Do not overuse. Amyl nitrite dilates the blood vessels and lowers blood pressure. While excessive use might put the victim in shock, this has not occurred in practice at Du Pont plants and we are not aware of any death from treatment with amyl nitrite. (See below paragraph E, MEDICAL TREATMENT).
- B. FIRST AID - INHALATION OF CYANIDE - Carry victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A). Remove contaminated clothing. Keep patient quiet and warm. Call a physician.
- C. FIRST AID - SWALLOWING CYANIDE
1. CONSCIOUS: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.
  2. UNCONSCIOUS: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. FIRST AID - SKIN OR EYE CONTACT (SKIN ABSORPTION)

1. EYE CONTACT: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.
2. SKIN CONTACT: Wash skin to remove the cyanide while removing contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

Follow paragraph A if treatment is needed, but even severe skin contact may not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if source of cyanide intake is not removed and treatment provided. Even after washing the skin, the victim should be watched for at least 1-2 hours because absorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. MEDICAL TREATMENT

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10 + 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given to the size and condition of the victim as treatment is proceeding. It is not essential that full quantities be given just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

Du Pont's experience in treating cyanide poison cases is that first aid procedures using amyl nitrite and oxygen were effective and the only treatment needed in most cases. Medical treatment using intravenous injections, was used in a few cases. Both procedures have been successful.

## **PROTECTION INFORMATION**

### **Ventilation**

Good ventilation should be provided to keep dust and HCN gas below exposure limits.

### **Personal Protective Equipment**

Recommended Minimum Protection - chemical splash goggles and rubber gloves (butyl preferred). Have available and use as appropriate:

- Face shields; rubber suits, aprons, and boots.
- Disposable respirators (if dusty conditions exist).
- Self-contained breathing air supply (in case of emergency).
- HCN detector.
- First Aid and Medical Treatment supplies\*, including oxygen resuscitators.

\* See Du Pont Sodium Cyanide Storage and Handling Bulletin for list of supplies.

## **DISPOSAL INFORMATION**

### **Aquatic Toxicity**

Highly toxic to marine life.

### **Spill, Leak or Release**

Sweep up and shovel into a covered container or plastic bag pending transfer to a disposal facility. Keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State, and local regulations on reporting releases.

### **Waste Disposal**

Comply with Federal, State, and local regulations. Do not flush cyanide into sewers which may contain an acid. Detoxify with sodium hypochlorite, calcium hypochlorite, or hydrogen peroxide; flush to waste treatment system; or call a licensed disposal contractor.

## SHIPPING INFORMATION

### Transportation

DOT Hazard Class.\*: Poison B

IMO Class.: 6.1

DOT Shipping Name\*: Potassium Cyanide,  
Solid

UN No.: 1680

NA No.:

RQ Quantity\*: 10 lb/4.54 kg

### Shipping Containers

100 lb and 200 lb steel drums.

### Storage Conditions

Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution run-off from water used for fire fighting.

\*49 CFR 172.101, Hazardous Materials Table

## ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Sodium Cyanide Storage and Handling Bulletin.